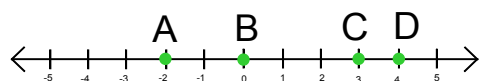


1-3 Distance and Midpoints



$$AB = |-2 - 0| = 2$$

$$AD = |-2 - 4| = 6$$

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The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

EX: A(-2, -3) B(2, 4)

$$AB = \sqrt{(-2 - 2)^2 + (-3 - 4)^2}$$

$$16 + 49$$

$$AB = \sqrt{65}$$

65
5 13



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EX: C(6, 3) D(0, 0)

$$CD = \sqrt{(6 - 0)^2 + (3 - 0)^2}$$

$$36 + 9$$

$$45$$

$$CD = 3\sqrt{5}$$

45
9 5

Find MN and OP

Do

1. M(-5, -2) N(1, 4) $MN = 6\sqrt{2}$
2. O(-1, -1) P(20, 6) $OP = 7\sqrt{10}$

$$OP = \sqrt{(20 - (-1))^2 + (6 - (-1))^2}$$

$$441 + 49$$

$$\sqrt{490}$$

$$49 \quad 10$$

$$7\sqrt{10}$$

7

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Midpoint of a Segment

Midpoint—point halfway between endpoints of a segment

--Average of the coordinates

The Midpoint Formula

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$$A(5, 3)$$

$$B(-4, -2)$$

$$M\left(\frac{5 + (-4)}{2}, \frac{3 + (-2)}{2}\right)$$

$$M\left(\frac{1}{2}, \frac{1}{2}\right)$$

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Find the midpoint

Do

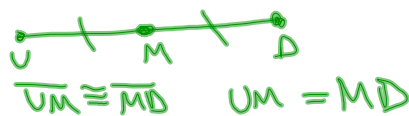
1. (4, -6) (-3, 2)

2. (-4, -3) (8, 5)

$$\left(\frac{1}{2}, -2\right)$$

$$(2, 1)$$

M is the midpoint of \overline{UD}



Suppose:

$$U(5, 2)$$

$$M(3, -1)$$

$$P(1, -4)$$

$$3 = \frac{5 + x}{2}$$

$$6 = 5 + x$$

$$1 = x$$

$$-1 = \frac{2 + y}{2}$$

$$-2 = 2 + y$$

$$y = -4$$

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Do

1. $U(-5, -3)$ $M(-6, 4)$ Find D $(-7, 11)$

2. $M(-3, 3)$ $D(-14, 12)$ Find U (x, y)

$(8, -6)$

$$-3 = \frac{-14 + x}{2}$$

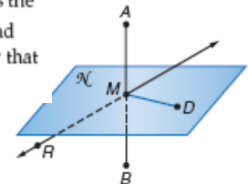
$$-6 = -14 + x$$

$$3 = \frac{12 + y}{2}$$

$$6 = 12 + y$$

Segment Bisector—segment, line, plane that intersects a segment at its midpoint

In the figure at the right, M is the midpoint of \overline{AB} . Plane \mathcal{N} , \overline{MD} , \overleftrightarrow{RM} , and point M are all bisectors of \overline{AB} . We say that they *bisect* \overline{AB} .



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HW

p25-26

13-39odd, 43, 45

(not 19,21)

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